Including SCA Principles in the Signal Processing Subsystem

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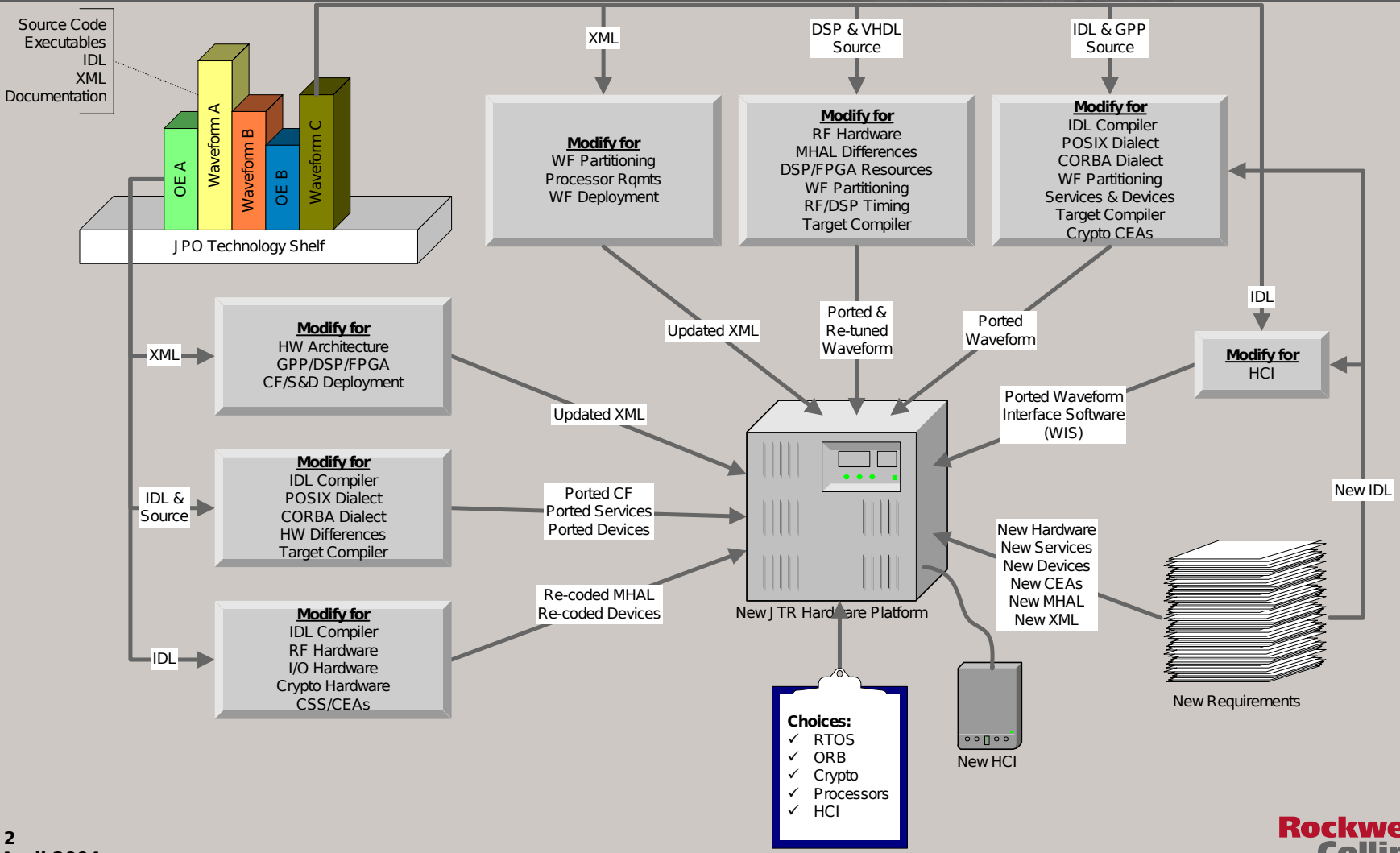
JTR Waveform Insertion and Portability



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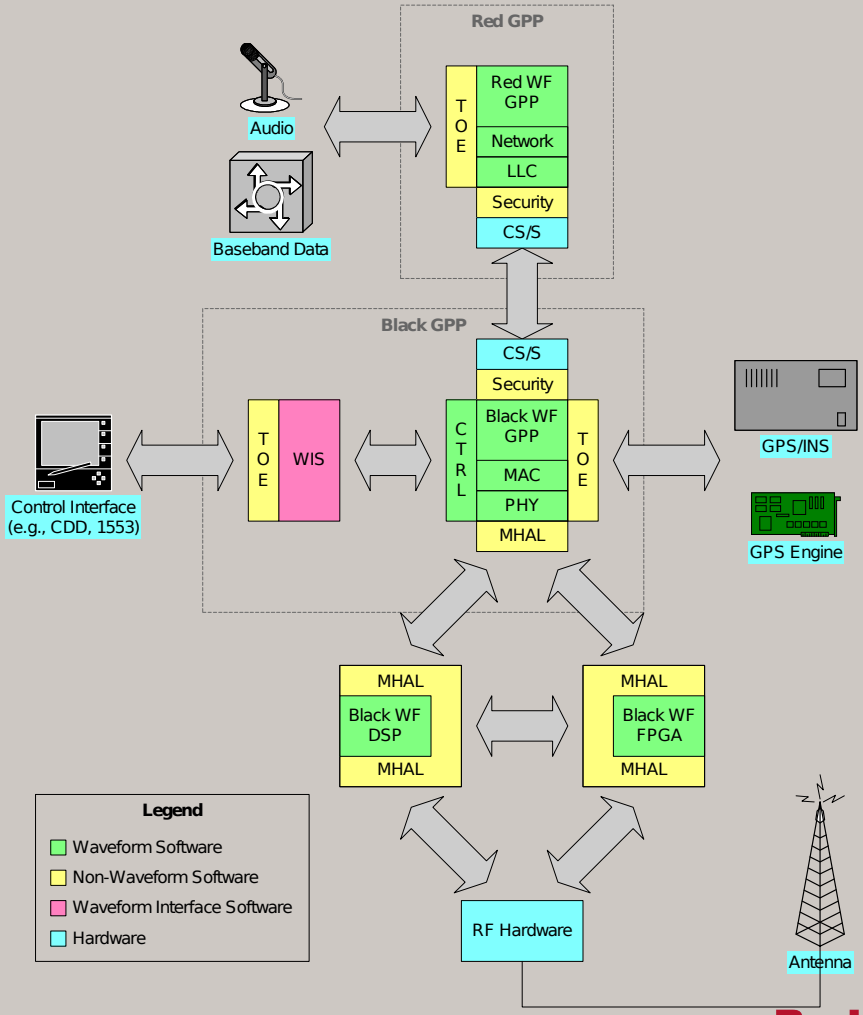
JTR Waveform Portability

- Waveforms (shown in green) are distributed within a JTR channel across the processing engines (GPP, DSP, and FPGA)
- Waveforms are encapsulated on all sides by abstraction layers
  - Radio Services & Devices (TOE)
  - Radio Security Service (RSS)
  - Modem Hardware Abstraction Layer (MHAL)
  - Waveform Interface Software (WIS)
- Required changes to waveforms when porting to a new platform must be restricted to the MHAL and any Hardware Dependent Waveform Software



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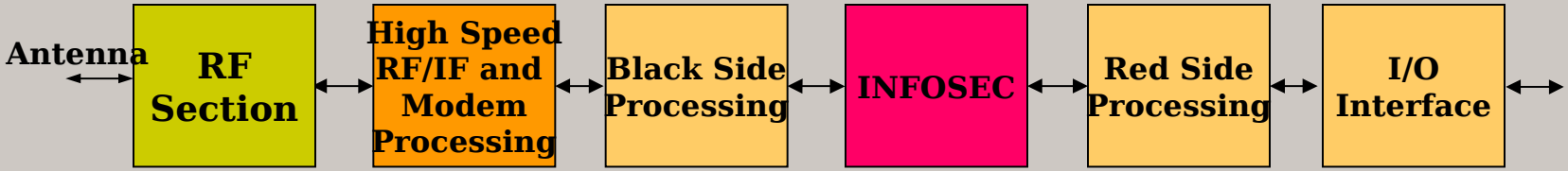
JTR Waveform Structure

- Structure & functionality for Above 2 GHz waveforms is the same as Below 2 GHz waveforms.



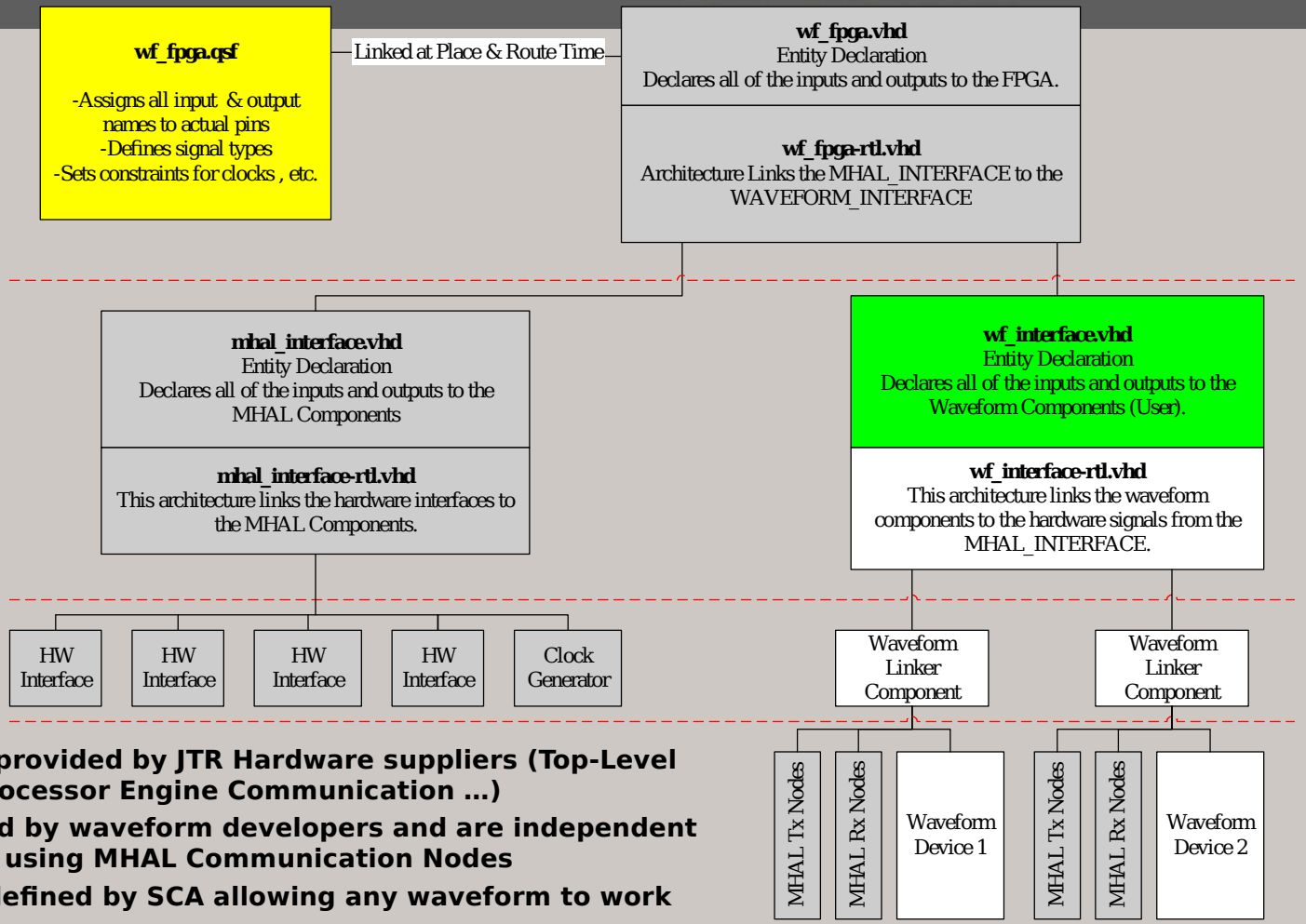
- Above and Below 2 GHz Comparison

Parameter	Below 2 GHz	Above 2 GHz
Waveform Primary Application	Terrestrial (tactical) with UHF SATCOM	SATCOM and Terrestrial (ISR)
Waveform Signal Bandwidths	5, 25, 50 KHz 1, 3, 10, 30 MHz	30, 42, 90, 180 MHz (some <30 MHz)
Data Rates	< 20 Mbps	> 274 Mbps

- High data rates and complex waveform processing may require specialized hardware, but waveform portability can still exist.

JTRS FPGA Waveform Hierarchy and Portability

- **Figure describes the current JTRS Cluster 1 FPGA Hierarchy.**
- **SCA Concepts can exist in the FPGA and it makes sense to implement them to promote waveform portability as well as evolving technology.**
- **Requires that a standard for the FPGA hierarchy be developed by the SCA and strictly adhered to.**
- **Hardware Interfaces and even part selection can be abstracted from the waveform.**
- **Use of VHDL and industry standard EDA tools are required.**



- **Gray and Yellow Items provided by JTR Hardware suppliers (Top-Level files, HW interfaces, Processor Engine Communication …)**
- **White Items are created by waveform developers and are independent of hardware except for using MHAL Communication Nodes**
- **Green Item should be defined by SCA allowing any waveform to work with any JTR hardware**

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Summary

- **Leverage JTRS Cluster 1**
  - **Provides operational leverage across a large fielded radio population**
  - **Supports production and logistics economies of scale (cost, maintainability, and operational availability)**
  - **Designed to facilitate ease of tech insertion to keep pace with evolving technology and CONOPS**
  - **Extendable for above 2 GHz capabilities**
  - **MHAL is a good start to abstracting FPGA and DSP components and promoting reuse of waveform components.**
- **Moving the SCA to the Signal Processing Subsystem is possible and can happen, but need more detailed standards to ensure waveform portability.**

Opportunity to set standards to ensure joint interoperability
and
realize DOD's Vision is NOW!